UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

October 30, 2012

REPLY TO THE ATTENTION OF:
SR-6J

Mr. Jerry Winslow
Principal Environmental Engineer
Xcel Energy
414 Nicollet Mall, MP 7A
Minneapolis, Minnesota 55401

RE: EPA comments to Geotechincal Investigation of the Pre-Design Study Work Plan
Ashland/NSP Lakefront Superfund Site

Dear Mr. Winslow:

The United States Environmental Protection Agency (EPA) Region 5, reviewed the Draft Phase 1 Pre-Design Study Work Plan (PDWP) sent via e-mail on October 11, 2012, on behalf of Northern States Power Company (NSPW), (d.b.a. Xcel Energy). Below are our comments on the Geotechnical Investigaion section (3.1) of the PDWP. The comments on the rest of the PDWP will be submitted at a later date.

1. **General Comment:** Ensure that the testing covered under this comment letter are also included in the FSP and QAPP.

2. **General Comment:** The report misidentifies Table 3-1 and Figure 3-1 in Sections 3.1.1 and 3.1.3.

3. **General Comment:** No summary of the geotechnical investigation is included in the Work Plan. Include a summary of the various components of the proposed remedy.

4. **General Comment:** Drilling Technique - Any drilling through contaminated media into a clean area needs to be cased off. A casing should be set through the contaminated media into the top of the clean formation and drilling continued through that casing.

   Any drilling into artesian conditions should be done using mud rotary or equivalent to prevent blowout. If the drilling is through contaminated media, a double case technique should be used to prevent cross contamination.

5. **General Comment Corrosion/Compatibility Testing - Missing Component:**
   a. Immersion Test (Corrosion/Compatibility Testing) should be performed on the anticipated candidates for the steel sheet and for the grout/sealant. The purpose of this test is to assist in identification of the steel and grout/sealant that is least prone to long term corrosion/pitting/degradation from the soil/groundwater conditions on the site.

6. **General Comment Permeability Testing of Confining Layer - Missing Component:**
   a. Testing the confining layer soil in the interval into which the steel sheets/slurry wall will be keyed into for hydraulic permeability is critical to ensure the barrier will successfully contain groundwater. Consideration should be given to taking one sample from near the bottom of this interval for laboratory analysis from each of the borings SB-159 to SB-165, and SB-167, SB-169, SB-171, SB-178, and SB-179.

7. **General Comment Slurry Mix Design - Missing Component:**
   a. The plan makes no mention of data/soil collected to support slurry wall design. This process typically involves:
      - Bentonite Evaluation – Determine Swell Index and Fluid Loss for various types of bentonite when mixed with site ground water.
      - Slurry Testing – Determine proper addition rate of bentonite to water to ensure trench stability.
      - Mix Design – Various different mixtures of dry bentonite addition to soil and each mixture is typically subjected to permeability testing to determine the performance of the various mixtures for use as a low permeability barrier.
      - Compatibility Testing of Final Mix – Long term compatibility/permeability testing of desired mixture with representative site groundwater and soils containing COCs to assess short and long term performance of the slurry wall. Certain chemicals can affect the performance and diminish the permeability of bentonite/soil mixtures. Compatibility testing of the anticipated mix design is required given the conditions existing on the site.

7. **General Comment:** It has been proposed that the vertical containment wall concept design around Kreher Park will now consist of a sheetpile wall along the lakefront and a bentonite/soil slurry wall around the other three sides. Coal-tar DNAPL is known to exist in varying amounts throughout the subsurface in Kreher Park. Serious questions have been raised regarding the compatibility of these compounds with bentonite/soil slurry pertaining to reduction of permeability and structural integrity, notably by McCaulou & Huling in Compatibility of Bentonite and DNAPLs, GWMR, spring 1999 among others. No compatibility testing is proposed in the PDWP for the proposed bentonite slurry mix with site groundwater, site contaminants and site soils. Compatibility testing of all aspects of the proposed Bentonite slurry mix design with the site soils, groundwater, and contaminants must be conducted to demonstrate compatibility and that long term structural integrity and permeability will not be compromised during the installation of the bentonite/soil slurry containment wall.

8. **3.1.1 Baseline Geotechnical Investigation:** Little discussion was presented on the placement of the geotechnical boring locations for the containment system in Kreher Park. Addition borings along the shoreline should be included. These borings should be spaced at 100' intervals and extend to an adequate depth into the Miller Creek to assure that the sheet piling can be installed understanding that the Phase 2 sediment removal

may/will be done in the dry. As such, these borings must be advanced to a depth adequate to assess the thickness and properties of the Miller Creek Formation relevant to potential construction related failures including basal heave. The Work Plan must consider the data needs for the shoreline geotechnical borings with respect to the design and installation of proposed bulkhead wall and the function of the bulkhead wall during the Phase 2 remediation.

9. **Section 3.1.1:** The simplified description of the subsurface stratigraphy of the site should be modified to include ranges for each identified stratigraphic unit.

10. **Section 3.1.1:** Permeability tests are not included in the list of tests in TABLE 3-1. Laboratory permeability tests should be conducted, at least one per boring, on representative samples from within the anticipated zone that the barrier walls (slurry, sheet pile) are to be keyed into the Miller Creek formation.

11. **Section 3.1.1:** Soil boring depth of SB-161 to SB-164 are anticipated to be 50-feet according to Table 3-1; however, this would likely result in the borings being advanced into the Copper Falls from approximately 5 to 15 feet according to cross sections from the RI. These borings should be cased off in the Miller formation prior to advancing into the Copper Falls to prevent cross-contamination. If it is not the intention for the borings to be advanced the entire 50-feet, and the borings are to stop at the top of or before the Copper Falls, then the text should be restated to clarify the procedure. Currently the text states "The soil borings are drilled to a minimum depth of 15 feet into the Miller Creek Formation or as listed in Table 4-1, whichever is greater."

12. **Section 3.1.1 and Figure 3.1:** The borings for the shoreline bulkhead design are not uniformly spaced along the shoreline and exceed 150 Ft spacing leaving significant gaps (up to 250 ft) along stretches of shoreline where there could be significant changes in lithology and soil characteristics. The number of boring should be at least doubled, perhaps by placing a new boring between each of those currently proposed and the spacing revised to approximately a maximum of 125 ft, but more frequent borings allows for better characterization of the depth to confining layer and the characteristics of the soils that the shoreline bulkhead is to be seated in which is critical to design of a successful containment structure that can meet performance requirements for all potential remedies for sediment removal.

13. **Section 3.1.4:** Thin wall Shelby tube samples are to be taken at varing depths so that the Shelby tube samples are collected over the entire thickness of the Miller Creek formation. This may not be possible, as previous logs of borings through the Miller Creek indicate many intervals where blow counts exceed 10-15 per foot above which thin wall tubes often crush. How will thin wall tube samples be distributed when this situation is encountered in the field? Will the frequency of thin wall tube samples be increased to every other sample or every second sample? Please consider previous data collected at this site to inform this work plan.

14. **Section 3.1.4:** The Work Plan proposes the following frequency for collection of Shelby tube samples for laboratory testing; "One thin-walled tube sample is collected in the Miller Creek Formation out of every three split-barrel sample collected. Thin-walled tube sampling depth is varied in borings SB-174, SB-175, SB-176 and SB-159 through SB-165 so that thin-walled tube samples are collected over the entire thickness of the Miller Creek Formation." This results in only 1 set of laboratory samples per 9 feet, assuming a 3-foot ASTM Shelby tube. This frequency of sampling is insufficient to establish a robust record vertically for strength of the formation for design of the containment walls. The number of thin-wall tube samples should be increased to one per one or one per two split-barrel samples to obtain better continuity for vertical strength data.

15. **Section 3.1.5 and Table 3-2:** No mention is made of hammer blow counts in this Section. Boring records must include blow counts. State clearly in the text that blow counts will be recorded on the field logs.

16. **Section 3.1.6:** Table 3-2 list only 3 UU-Unconsolidated/Undrained Triaxial Compression (ASTM D4767) and 7 Qu- Unconfined Compression Test (ASTM D2166). This is less than 1 UU test per boring and one Qu test per boring, insufficient to characterize a formation with a large degree of variability in terms of soil strength. Both the number of tests and the number of borings should increase significantly to provide a robust data set for analysis of the Miller formation.

17. **Table 3-2:** The number of Atterburg limits tests are insufficient. This is a critical parameter that is used in conjunction with other tests for analysis of soil characteristics. All collected samples to be sent for laboratory geotechnical analysis should be testing for sieve/hydrometer and Atterburg limits.

18. **Table 3-2:** Boring records must include blow counts.

19. **Table 3-2:** Consider at least one dimensional consolidation test for thermal desorber pad

20. **Table 3-2:** The ASTM test number is incorrect. Replace reference to ASTM D4767 with ASTM D2850 (proper Unconsolidated/Undrained Tri-axial Compression ASTM test number)

21. **Table 3-2:** The number of unconsolidated, undrained, triaxial compression tests is insufficient. This is a critical parameter for assessment of cohesive soil strength for containment design purposes. Increase the UU test frequency to 1 per boring for SB-174 to SB-176 and to 1 per boring for SB-159 to SB-165.

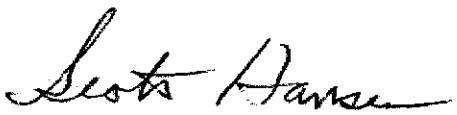
22. **3.6.3 Copper Falls:** Additional borings should be advanced in the area of free product under the Our Lady of the Lake church property to clarify why that free product plume has migrated in that direction and how it can be removed.

Field Sampling Plan (Note: Comments Related to Only Geotechnical Investigation)

1. **Section 2.2.1:** The description involves collecting composite samples from 10 boring locations, then the composite samples from two individual soil borings will then be composited into one composite sample for analysis. Does this mean that 8 of 10 borings will not be analyzed? The product produced from MGP plants was highly variable in nature due to poor quality control and changes in production methods over time. Suggest more analysis of discrete samples to account for the variability in the soil and coal-tar product that will be loaded into the desorption unit.
2. **Section 2.2.1:** Geotechnical Sample Location and Frequency, 7th Paragraph – The description involves collecting composite samples from 6 boring locations, then the composite samples from three individual soil borings will then be composited into one composite sample for analysis. Does this mean that 8 of 10 borings will not be analyzed? Suggest more analysis to account for the variability in the soil that will be loaded into the desorption unit.
3. **Section 2.2.1.2:** Although this is a geotechnical investigation, environmental data should also be acquired if it is easily done. All boring soil samples should be screened with a PID, and readings should be recorded on the boring logs.
4. **Section 2.2.1.2:** Observation of NAPL is not mentioned in this section. Note observation of NAPL and other visible site contamination on boring logs.

If you have any questions or would like to discuss things further, please contact me at 312-886-1999.

Sincerely,



Scott K. Hansen
Remedial Project Manager

cc: Jamie Dunn, WDNR
Ompakash Patel, Weston Solutions
Michael S. Raimonde, Foth
Rick Halet, Xcel Energy